The MAC Flyer

MARCH 1974

Sector Altitude vs. Vector Altitude. Page 12

The MAC Flyer

MILITARY AIRLIFT COMMAND

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For Greater Efficiency
in MAC Air Operations

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COVER: Descending below hazardous mountain peaks, a MAC Starlifter prepares for an approach.

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Flyer Call

A couple of months ago we set out to determine what flight crews, and safety officers in particular, thought of THE MAC FLYER as a safety tool.

The response: A flood of letters from around the Command, virtually all of which described the magazine as an effective method of spreading the message. Even more important, some readers pointed out which features they found most useful. For example, C. R. Terror apparently is the most widely read feature, with "Quick Stoppers" and "Mishaps with a Moral" following closely.

Not everyone agreed on just which features best serve the aircrews. A minority view was that C. R., who has endured the rigors of reader whim for nearly 20 years, should be retired and replaced by a young, home loving pilot who follows all the rules.

Do you think our publication's unofficial mascot, "Fanny Flyer," is degrading to women? One of our readers does, and we can't knock the fact that readers have diverse opinions.

THE MAC FLYER isn't likely to reach such lofty editorial heights as "Playboy" or "Time" magazines, but our editors feel more original material (articles, photographs, and drawings) would render the magazine more effective. Trouble is, our staff can only produce so much copy. The MAC Flying Safety Writing Contest is designed to help provide this creative element. And while we sponsor no "Photography Contest" or "Art Contest" there is an increasing need for photographic and artistic input (for use as magazine covers or illustrations) from airmen in wings, squadrons, and detachments.

Monotony pushes common sense aside during the...

Hours of Boredom

by 1st Lt Thomas G. Miller
Det 5, 40 ARRS
APO San Francisco 96237

Interrupted by moments of stark terror. You've all heard flying described that way, haven't you? Most pilots have experienced situations that make that description valid, whether in combat or during some unpleasant in-flight emergency. Well, I had my first experience of this kind the other day.

I was upgraded to aircraft commander in a rescue helicopter in Southeast Asia about two months ago. It was a long haul, but I finally made it. It seemed to be uphill all the way, what with a shortage of instructor pilots and flight examiners just at the wrong time. I was kind of proud of myself. I knew the Dash One inside and out. Emergency procedures were second nature. I was the only lieutenant aircraft commander in the outfit. I was really the stud.

My first few flights after upgrade were really cautious. Straight by the checklist. As my experience grew, I became more relaxed as the man in command. I'd seen so many older heads run the checklist from memory, that it seemed the thing to do. So I did it, too.

BOREDOM— continued

The peace treaties had put an end to all real combat missions, and flying for everyone was a bit dull. For our rescue outfit, 24-hour alert periods were really a drag. I already had my next assignment — the Panama Canal Zone, in Jolly Greens, a step up from old Pedro. I was getting short. Training flights were the only thing we had to break the monotony. Monotony — that's the word all right. Monotony, boredom, apathy — they're all a factor in more accidents than we care to admit.

I used to pride myself on my common sense, but those hours of boredom — that monotony — had slowly pushed that one great weapon against accidents to the back of my mind. Then, about two weeks ago, we found an eight-mile stretch of clear rice paddy not far from the base. It made a great place for "gun runs." No jungles to clutter our path, no power lines to snag us in mid-air, no houses — nothing. Stud that I was, I made a fantastic run at 80 knots, about six inches above the rice. It was exciting and really impressed the other crew members. It sure beat an hour and a half of flying around the flag pole. After I landed, I told myself that it was really a dumb thing to do, but there was no real danger. I promised myself, though, that I would never do it again. Next time up, however, my copilot just happened to be another lieutenant who had not yet gained the distinction of being an aircraft commander. My flight mechanic was young and had only heard of the great "Rice Paddy Gun Run." One more run would be great for morale, and since I knew the area, there would be no danger at all.

Being the kindly person that I am, I let my copilot make the first run and, as I had hoped, he flew at an outrageous 15 feet above the waving rice. His max speed was only about 50 knots. For the uninitiated it was not a bad run. The crew laughed about the slow 50 knots, and joked that we would have to pick rice off the bear paws and wheels. But now, it was my turn. I made a wide, slow turn at about 300 feet and then nosed old Pedro over. In a fairly steep dive, we were heading for the approach end of the run. Airspeed: 80 knots; altitude: 50 feet, 40, 30. I could see the copilot's eyes growing large with approval — right on down to six inches. What an amazing display of airmanship! Screams of delight crackled over the interphone. I made some wide turns around a few of the small bamboo groves that dotted the area. Nothing to worry about, though. There were none of those wires that had snagged so many of my fellow aviators; no fences; no houses. Just wide open rice paddy ahead.

I was just beginning to explain the technique I would be using in a cyclic climb to trade my 80 knots for 500 feet when the hair on the back of my neck stood on end. I felt as though something was about to happen! Something was about to ruin my "gun run." Something wrong.

The instruments checked okay. My eyes flashed back and forth ahead of the aircraft trying to find some obstacle that I had missed on previous runs. In the same instant, what was left of my common sense said, "Climb! Get out of this place!" My heart beat faster and my forehead and palms were covered with a cold sweat. There was nothing in front of me — nothing to grab me. I had checked — nothing!

Only a fraction of a second had passed since the feeling of stark terror had closed in on me. I eased back on the cyclic to gain altitude. My path was still clear. Not a thing in sight. I still had a mile to go before I reached the end of the run and any obstructions. But before the helicopter could respond to my inputs, I saw them. Birds! A great flock of birds was rising from the deep rice just ahead of me.

I was much too close and too low to turn. Why had these stupid birds chosen this moment to fly? I yanked back on the cyclic, hoping that the fuselage would shield the blades from damage, but I wasn't that lucky. The first bird hit the windshield on my side and exploded back across my armor plate. The second hit somewhere underneath the helicopter. The third was the one that really got us. It must have taken a blade flap off because the '43 lurched to the right and we felt a few violent, out-of-track beats before the blade dipped into the rice. We were out of control now, making what seemed like a very slow roll onto our back. We traveled only a very short distance before we impacted the ground. The fire was small. It did very little damage. There wasn't much left to damage. Our high speed and low altitude had caused the damage. The transmission came ripping through the cabin, killing the flight mechanic and copilot instantly. I never figured out what it was

that took the back of my head off. I can remember no pain. I guess I never really expected any pain with death, though. My life didn't pass before my eyes.

My first thought was how I was going to explain the mess to the commander and the safety officer who had harped on this very subject over and over. I quickly realized that I would never be so lucky as to explain anything to anyone again. I was dead. That was fact. Death is a very sobering experience. One's hindsight improves a thousand fold. Death really gets one's attention. Unlike all the safety

Full stop at the end of the "gun run"

briefings, one's priorities are drastically rearranged and those things that a moment ago were most important suddenly are on the bottom of the list.

I wondered how the accident investigation team would find out that we were on a "gun run." I wondered, too, how my parents would take the news. I really felt bad about the other two guys. They were both married and one's wife just had a little girl. I'll have a lot of time to sit back and ask myself how I got into such a predicament. Why did this have to happen?

The thing is, it didn't have to happen. I made it

ABOUT THE AUTHOR

Lieutenant Miller is a 1971 graduate of the U.S. Air Force Academy and graduated from UHT in 1972. He upgraded to aircraft commander in the HH-43 in September 1973.

happen. I was responsible for the death and wreckage that lay before me. But how did a pilot like me get into such a position? Skill and cunning are my middle names, right? Horseplay! Inexperience! That's what they'll all say. Not true! There are a lot of pilots here with me who had logged thousands of hours in the type aircraft they were flying when they went down. There are many more who never called the fatal maneuvers they were performing "horseplay." Those words describe an action. They don't describe a cause.

For every dead pilot there is an expression for what got him — an excuse, a rationalization. There's Major Low here, whose excuse was unmarked wires. There's a colonel here, believe it or not, who flew into a mountain. There weren't too many that were on gun runs like me. Some were flying by instruments they wouldn't believe. Some were just cruising the airways, just slightly off course. Many got the ball rolling before they got off the ground; they just wouldn't believe their performance charts.

Hours of boredom caused it for me. Ignorance and pride caused it for many more. None of us here learned enough from those who had gone before. There's a wealth of information to be gained from the residents of graveyards. I wish I could get through to you. But I'll just wait for you to make that one slip. A little inattention to detail, a little cockiness, a little "kick in the pants" flight.

I'll talk to you more when you get here. Then, you'll see what hours of boredom are really like.

An old-timer tells how he views the...

Right Seat Pilot

by Maj Charles L. Pocock, MAC/IGYF

The two sergeants leaned back and sipped steaming coffee from styrofoam cups. The glistening terminal cafeteria contrasted sharply with their dark green Nomex flight suits and the drizzly flight line outside.

The two men continually glanced from the cafeteria crowd to the yellow fuel truck which was pumping blood and muscle into their C-141 just outside. They were waiting for the ground crew to button up the refueling equipment so they could start power for preflight. The 0215 takeoff time was only an hour and a half away and the activity in the terminal was picking up. Families began arriving with prodigious luggage, last-minute gifts, sleepy kids, and well-wishing friends. The emergency leave passengers were hanging around the space "A" counter wearing slept-in uniforms and carrying only AWOL bags and worried faces. The R and R passengers were looking forward to the trip on MAC 60165 and a few days of new scenery away from their daily grind.

The older sergeant, the one with the 15,000-

hour safety patch and a 5,000-hour C-141 pin on his name tag, swallowed the last of his black coffee. "Ya' know, I must have done this a thousand times, but I still get a kick out of helping these GI's get from one place to another."

"I know," replied the young staff sergeant. "Even when I was a crew chief, I never felt as important as I do now as a second engineer."

A pretty young blonde, clutching a green suitcase with one hand and holding her hat on with the other, walked briskly toward a waiting mini-bus.

"Hey sarge! Isn't that the 'Stew' we saw Lieutenant Smith with at Travis the other night? I wonder if he knows she's here."

"He knows. I'll bet he's hoping the airplane will break so we can go back into crew rest."

"Not him," the younger sergeant drawled. "As much as I envy his way with the dollies, I don't think he likes anything better than flying. But — I'll admit he's a little hacked off with this new copilot landing policy. It has really hit him hard."

"What do you mean?" snapped the old timer.

"Well, for heaven's sake, he's one of the sharpest copilots in the squadron. They crewed him with a brand new aircraft commander — you know, to kind to keep him out of trouble. You wouldn't want to match a brand new copilot with a brand new AC. Well, he takes it real personal that he's stuck in the right seat all the time now. The only time he gets to land is in the local pattern with an instructor. He's almost ready to upgrade and he thinks this new policy is a slap in the face — or in the pride, maybe."

"Wait a minute, buddy," the old sergeant cut in. "You youngsters have forgotten a couple of facts of life. Or maybe you just never learned them. First off, I agree that Lieutenant Smith is one of the sharpest young officers to come down the pike in a long time, and one of these days he is going to make a fine AC, maybe even IP and flight examiner. Secondly, I'll agree that it's smart to send an old timer out with the new head. You and I are flying together for that reason, aren't we? But, look at it this way. When you put that new AC in the right seat and the copilot in the left seat to land, that new AC actually is performing the job of an IP.

"The copilot, in the right seat, has a full-time job helping the new AC. Being the best damned copilot in this world is important too, you know. What's the big deal about the left seat, anyway. I always thought switching seats would be confusing. Airline copilots never get near the left seat until they upgrade; then, when they are captains, they never return to the right seat unless they upgrade to instructor. We're just doing the same thing. It makes sense to me.

"You said this was a new policy. Well it's not — it's really the old policy warmed over.

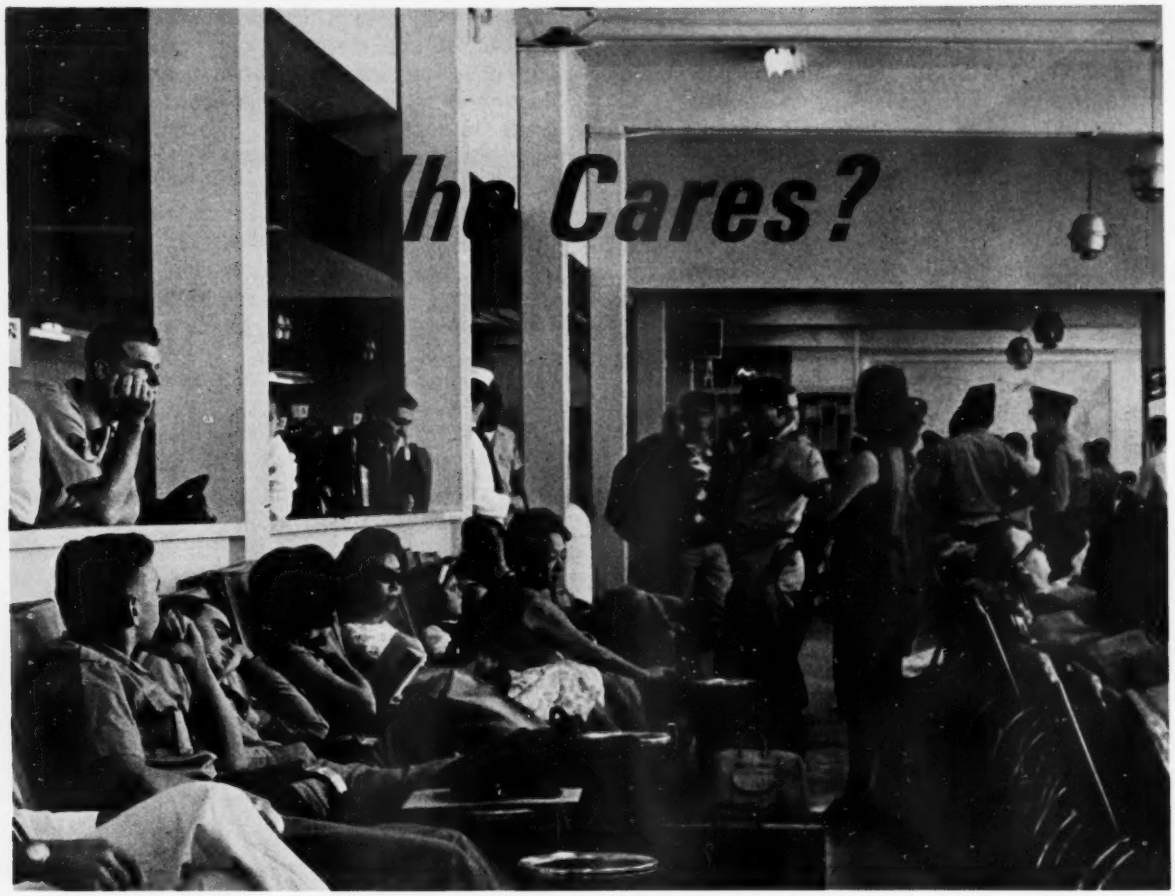
"When I was flying Shakeys, 2,000 hours was the minimum for AC upgrade; but most copilots had to have 2,500 before they were good enough, and damned few made it on their first hitch. A six year 'fogie,' upgrade to AC, and making captain all in the same year was the MAC triple header. Now, we've got more reliable airplanes and better trained pilots, but these new copilot landing restrictions aren't nearly as tough as they used to be. You probably can't remember when second pilots were only allowed to land an empty airplane and only the AC could make the landing when passengers were on board. Since we're not flying as much anymore, there are a lot of rules I'd like to go back to. And, that's not a slap at anyone.

"Don't feel sorry for the copilots. They won't be copilots forever. Feel sorry for those folks out there in the terminal. The major and his wife with their three kids. That PFC over there that looks like he's on his way home to bury his Mom, Dad, or brother. Or, how about that navy chief, bird dogging the school teacher — bet they're going on R and R. What do you think they would do if we told them the AC only had 1,150 hours, the copilot even fewer, and this is the copilot's leg! Feel sorry for them, that's what. They deserve the best we can give them. Feel sorry for their families — for our patients, for our cargo shippers and receivers, for the taxpayers that bought the airplane. Hey, feel sorry for you and me! Ain't we entitled to the very best. Feel sorry for the copilot and AC when the new AC can't salvage a bad copilot landing — let's give everyone the best we've got, and do our training with instructors.

"Balls of fire let's get going. Why weren't you watching that fuel truck?"

"Boy, I don't know sarge. I guess you're right, but you sure get wound up once you get started, don't you. Sorry I mentioned it."

One crew's apathy destroyed an image which took years to build. But, then...



by Maj George D. Burgess, Associate Editor

It's no wonder the Army sergeant was unhappy. He'd been beat around many times before during his career. After all, he wasn't in a Boy Scout troop. But, this time he had his family along. And they had no obligation to endure the rigors of his chosen profession, except to keep his home a pleasant place for the warrior to relax and watch his progeny grow. He took pride in them, and knew he was doing his best to make a better world for them. The lifer was more than willing to withstand the hardships of long separations and the dangers of combat, because he believed in what he was doing. He was willing to stake his life on his profession.

But, there were limits to this man's sacrifices. There were boundaries beyond which no one dared to cross without unleashing the wrath of the disciplined soldier. Most of his life had been lived under simple rules. He had no difficulty identifying his enemy and even less trouble disposing of him. But this case was different. This time he could not clearly identify his adversary.

The sergeant was returning from an overseas assignment with his family. One of the contract carriers was on strike and the passengers had to be flown by a MAC transport. No problem. For years MAC had flown thousands of satisfied passengers. But — this case had been different.

The passenger terminal representatives were

courteous enough. The bags were weighed, tagged, and the meals ordered. And the boarding time was established. After what seemed an eternity to the homesick family, they finally boarded the huge jet for the homeward flight.

The family's contact with the crew was through the loadmaster, a man who had not been trained as an airborne hostess. The soldier overlooked the young airman's rudeness, but felt that this man in charge of the cabin was somewhat irritated with having to look out for passengers instead of the cargo he was accustomed to working with.

The passenger briefing was inadequate. The soldier's wife didn't understand the oxygen equipment briefing. And she was unsure just how the life vest was to be worn. Her husband had been this route before and he provided the information.

The takeoff seemed rough. Neither the soldier, his wife, nor their three children particularly liked to fly. The aircraft seemed to be tossing around a lot as it whined toward altitude. The sergeant felt as if the plane was suddenly falling instead of climbing as the pilot raised the flaps. One of the children had a startled, sickly look as the negative G-forces pulled at him.

The bouncing and buckling continued for some time. When it seemed as if predeparture meals could stay down no longer, a reprieve was obtained as the bumping stopped. Smooth air had been gained at last. But the smooth flight was not to come yet. Again the passengers felt the pit of their stomachs rise as the aircraft leveled off abruptly.

"Some pilot we have tonight!" the sergeant commented. No sooner were the words uttered than it was time to reduce power on the powerful turbofan engines. The aircraft jerked as the throttles were yanked back. The man and his wife looked at each other, and then they saw the apprehension in the faces of their children as the noise level changed rapidly. One of the young boys said he didn't like to fly. Another said he was afraid he might be sick. And the girl's face showed she was glad to be sitting close to her dad.

Again, the sergeant glanced toward the cockpit, wondering what had happened to the smooth pilots MAC used to have. He could remember deploying overseas years ago and having a silky smooth ride in an old prop job. Oh, well, times are changing, he rationalized.

The rest of the flight was uneventful until descent. The cabin temperature wasn't very comfortable, but the sergeant found some blankets for his family. When the cabin got too hot they just pushed the covers aside, and when the cabin cooled down too much, they just bundled up. About half way through the flight the loadmaster handed out lunches, so, the long hours across the ocean were tolerable.

The seat belt and no smoking signs lit up. The loadmaster told the passengers to strap in, for the descent was about to begin. It did, with heart stopping abruptness. The power on the big jet was reduced suddenly for the long glide toward its destination. The young daughter grabbed her father's arm, not understanding what was taking place. The father understood that power must be decreased for the descent, but he questioned the pilot's technique.

The passengers braced themselves as the descent began. They didn't feel any better about being tossed around, but they were beginning to see what it took to endure such flights. A series of level-offs and descents followed; none was conducive to passenger comfort. "Boy, if I ever have to fly on MAC again . . ."

Who Cares? continued

The noise of the engines, flaps, and landing gear, and the bouncing during descent, finally became too much for the young daughter. She could no longer hold back her meal. The sickness produced a spontaneous reaction by many of the other passengers. Before long the cabin was an unpleasant place.

As the aircraft taxied in after the surprisingly smooth landing, the lifer's mind raced across a spectrum of thoughts. He was tired, angry, and hostile. He wanted to strike out at something or someone. But, he didn't know what or whom it was that angered him. He couldn't positively say the pilot was grossly in error. After all, the sergeant hadn't been able to see outside the aircraft. Perhaps the pilot had done a magnificent job of controlling the aircraft. And perhaps the loadmaster hadn't felt well. But, it had not been a very pleasant flight and his family was even more apprehensive about flying now. And he knew he had experienced many airline flights previously which were much more enjoyable.

The sergeant's frustration really had no outlet. He took time to fill out one of the passenger service questionnaires and didn't mince words. He lashed out at the poor trip home. He felt this was about all he could do.

* * *

It takes only a handful of lifers like this Army sergeant to spread the word: "MAC has deteriorated to the lowest point ever." Such comments can do irreparable damage to an image that has been well earned over the years.

A few years ago, before contract carriers began flying most of the military passengers, MAC and its predecessor, MATS, was operationally committed to passenger airlift. Then every aircraft maneuver was planned well in advance. The result: a safe, smooth ride to destination. The propeller driven aircraft took much longer to fly across the pond, but the crews flew with pride, enjoying an empathy with the passengers in the back. The flight wasn't considered successful if any passenger complained of poor aircraft or passenger handling.

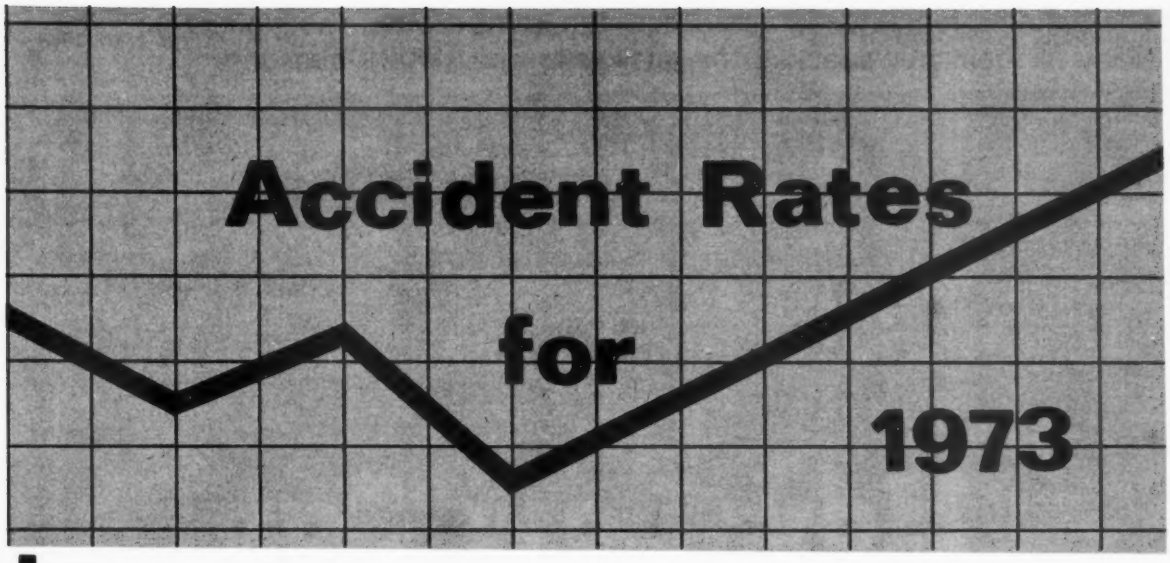
The MAC fleet today is engaged primarily in flying cargo. But the image of the MAC pilot remains that of a highly professional aviator, skilled in precision flying. He avoids the turbulent nuisances of old man weather by effectively employing his professional talents and the sophisticated machinery provided him. Most passengers who have flown on a MAC aircraft see the MAC pilot as one who flies smoothly around the world and who, with the finesse of a seasoned veteran, lands them safely at any destination. Pilots who fail to view passengers as the most precious commodity transported by the command damage this image. It may be easy for some pilots to forget that those who ride in the rear aren't interested in how great a "stick" they are. The pilot that passengers want in the left seat is the one who will put every effort into providing them a smooth, safe ride.

* * *

The Army sergeant didn't know what to do about his problem. He felt his family had been treated unfairly by MAC and he certainly wouldn't talk up the Command. A bad image is easy to create, while a good one takes years to build.

How about the image you're creating? Are you really trying to be smooth at the wheel? Do you make the cargo, as well as a passenger flight, a "work of art"? One thing is certain — pilots who fly the smooth bird do paint a favorable image in the minds of their passengers. And the image carries over to other crew members.

What's sweeter for a transport pilot than to have a passenger approach him following a tough flight and say, "Thanks. That was a super flight and a great landing. Hope to see you again."



It's time to reflect on the aircraft accidents for 1973, and while we don't enjoy reviewing grim statistics, we can learn much by looking for trends. The MAC trend turned upward as the number of major accidents increased from four in 1972 to six in 1973; there were three minor accidents each year. However, the rates for both categories climbed in 1973, since the Command flew fewer hours.

The rates (per 100,000 flying hours) for MAC and USAF are:

Major	**1972**	**1973**
MAC	0.53	1.03
USAF	3.00	2.30
Minor		
MAC	0.40	0.52
USAF	1.00	1.00

1973 MAC Accidents

Major — HH-43F, 12 Mar 1973, Ogden Municipal Airport, Utah. The aircraft landed hard from a practice autorotation. All four landing gear collapsed and both tail pylons sheared. There were minor injuries to both pilots.

Major — WB-57C, 27 Apr 1973, Kirtland AFB, New Mexico. The pilot was making a simulated single-engine approach when the airspeed decreased below safe single engine speed. The aircraft stalled during turn to final and crashed. The navigator ejected safely, but the pilot was killed.

Major — C-141, 12 Jun 1973, Dover AFB, Delaware. The nose landing gear collapsed upon landing as the oleo strut outer cylinder failed. There were no injuries.

Major — HH-53, 14 Jun 73, Lake Tonle Sap, Cambodia. The aircraft had just completed aerial refueling when it pitched violently up and then down. The tail rotor separated during a subsequent spiraling descent and the helicopter crashed inverted. Three crew members were killed and two parachuted to safety.

Major — C-141, 28 Aug 1973, near Torrejon AB, Spain. The aircraft impacted the ground during descent for landing at Torrejon. Seven crew members and 17 passengers were killed.

Major — HH-3, 22 Oct 1973, Osan AB, Korea. The aircraft flew into a hill in night VFR conditions. All four crew members were killed.

Minor — HH-43F, 4 Mar 1973, Nakhom Phanom RTAFB, Thailand. The engine compressor froze during flight due to materiel failure of an engine bearing. Landing gear, underside fuselage, and tail pylon were damaged during an autorotation into a rice paddy. There were no personal injuries.

Minor — HH-3E, 17 Jul 1973, Park City, Utah. The aircraft made a forced landing following a sudden decrease of rotor rpm and airspeed. There were minor injuries to the crew and minor damage to the fuselage and both main landing gear.

Minor — HH-53C, 12 Sep 1973, Kaneohe Bay MCAS, Hawaii. Just after touchdown, the right main landing gear collapsed. As the aircraft began settling to the right, the left gear collapsed. There were no injuries.

The battered remains of aircraft dot mountains around the globe. Many of their crews lacked the answer to one simple question.

How Low Can You Go?

by Capt A. R. Barbin, Associate Editor

Faith may move mountains, but no aircraft manufacturer has yet perfected an aircraft capable of drilling its way through a piece of real estate or any other such obstruction.

Yet aircraft of all categories continue to imbed themselves in mountains throughout the world, some of which rival Davis-Monthan as an aircraft boneyard. In most of these cases the pilots simply weren't aware of their proximity to the ground. That's what this article is about — terrain awareness.

Nonradar Environment

Most MAC flights operate under instrument flight rules in a radar controlled environment. But crews occasionally find themselves flying without the benefit of air traffic control radar vectoring or terrain guidance.

But radar, although desirable, is not a requirement for safe flight. DOD standard instrument departures, enroute low and high altitude charts, and instrument approach plates provide pilots minimum altitude information.

The most critical phase of flight, according to accident statistics over the years, is the approach and landing portion. And it is during these final few minutes, either while executing an approach or transitioning into it from cruise configuration, that flight crews seem most vulnerable to error.

One of the keys to a safe transition and approach is knowing the minimum altitude for your particular maneuver and how much terrain clearance it provides. For example, there are times when it is perfectly acceptable to descend lower than minimum sector altitude, but do you know under what circumstances this is true, just how low you should descend, and how much terrain clearance is guaranteed once you're there?

If you don't know this, then you may have felt rather squeamish about following some of the altitude clearances you have been issued during the transition phase. But whether you understand the significance of these altitudes or not, come along on a simulated trip to mythical Hilly AFB. You might pick up enough information to dispel your doubts concerning terrain clearance during transition to an approach.

You've successfully executed a Mountain Maze Four SID, avoiding one glacier and three moun-

tains that would thrill Sir Edward Hillary; you've kept the CDI centered, and cruised well above two snow-capped mountain ranges en route. Now, it's time to think about your next approach. Approximately 25 miles out of Hilly AFB, Center hands you off to Approach Control which dutifully informs you that radar is out and clears you for a VOR approach and descent to 2,500 feet. The low altitude instrument approach procedure indicates a minimum sector altitude of 5,000 feet for your line of flight. How low can you go? If you're uncertain of terrain and obstruction clearance between your position and the initial approach fix, try this: request clearance to maintain minimum sector altitude to the initial approach fix.

In some cases, this higher altitude might prove a little awkward should it require losing a few thousand feet outbound from initial; but by maintaining this altitude you'll know for sure that no hills or other obstacles are going to jump out in front of your aircraft before you reach initial.

Radar Environment

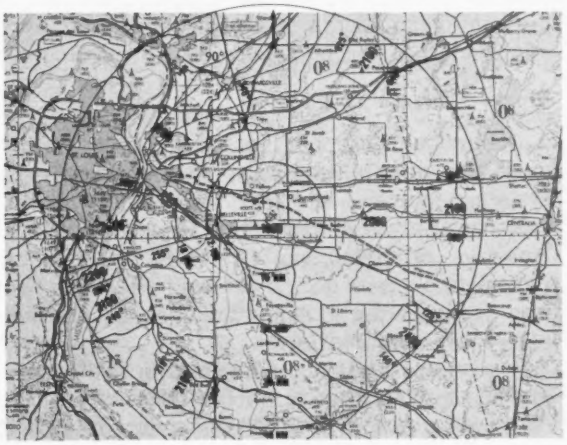
Suppose you're under radar control en route to another approach to Hilly. You're on a radar vector to an ILS approach. During descent, you note that the minimum sector altitude into Hilly is 5,000 feet and the decision height, 1,000 feet. At 25 miles from the ILS initial approach fix, the radar controller clears you to 2,500 feet. If you follow the clearance, you'll be below the 5,000 minimum sector altitude, right? Does the 2,500 assigned altitude provide obstruction and terrain clearance?

Yes, it does, because minimum sector altitudes are designed for **nonradar** environment. These altitudes provide 1,000 feet obstruction clearance (1,000 in mountains) from the highest sector obstacle for a distance of 25 NM from the navigational facility, the initial approach fix, or in some cases, the final approach fix. Sector altitudes are indicated only when a definite measuring point, such as a VOR, tacan, or NDB, is depicted. Sector altitudes are not depicted on high altitude plates. Instead, these plates show the minimum safe altitude within 25 nautical miles, which, in effect, is the highest minimum sector altitude.

Vector Altitudes

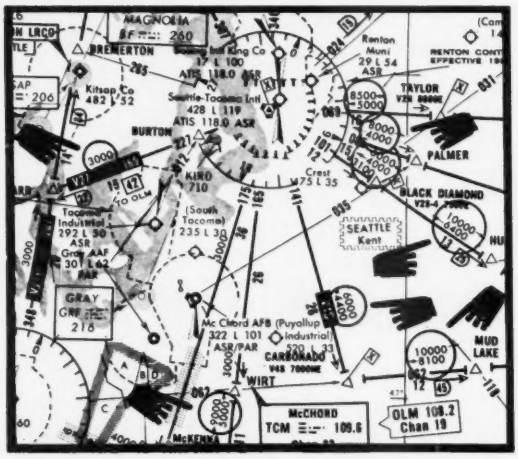
For radar vectoring, approach control further refines sectors into a dozen or more "mini" sectors, the final number depending on terrain height variation and terrain obstruction height. In each mini sector, a minimum altitude for vectoring aircraft is computed. Minimum vector altitudes provide 1,000 feet vertical and three miles lateral clearance from obstacles within 40 miles of the radar antenna. If the airport lies close to mountainous terrain, then the criteria is 2,000 feet and five miles. With this obstruction criteria, the radar controller can clear you to descend to 2,500 feet (in the above example).

Each radar controller has a minimum vector altitude map at his radar console for immediate reference. These charts show sector boundaries, minimum vector altitudes, radials, and mileages. So if you are issued an altitude clearance that you feel doesn't provide adequate obstruction clearance, let the controller know. Ask him to verify the minimum vector altitude in your sector. It's cheap insurance. If still in doubt, don't descend one millimeter below your sector altitude until you're



Minimum vector altitudes in the Scott AFB area

HOW LOW CAN YOU GO? — continued



Watch out for changes in MEA's.

absolutely certain that the assigned altitude will provide terrain and obstacle clearance.

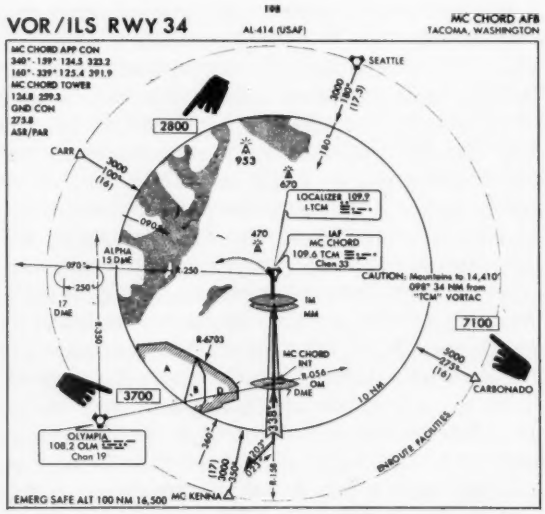
High altitude instrument approach plates contain a few pieces of handy information not depicted on FLIP low altitude plates. This includes emergency safe altitude within 100 nautical miles, minimum safe altitude within 25 nautical miles, and spot obstruction elevations located within 20 nautical miles. If you become disoriented, lost, or foul up the approach, swallow your pride, advise the controlling agency of your dilemma, and climb immediately to the minimum safe altitude.

Airway System

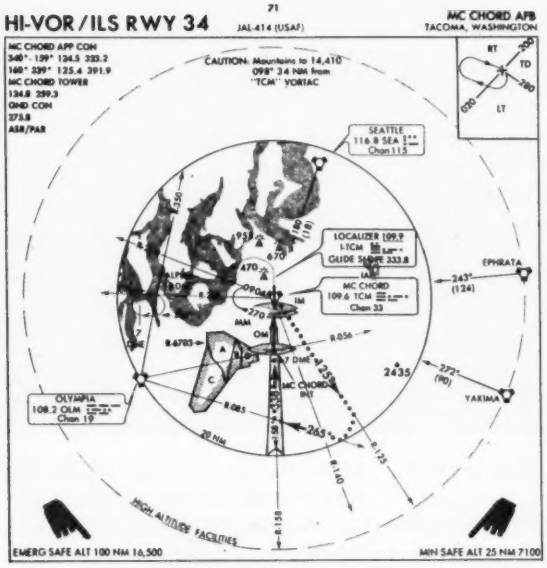
Obstructions are not limited to airport traffic areas, but often extend well into the airway route system. A latticework of high and low airways criss-cross most areas of the world. These aeronautical highways, presented on DOD FLIP charts or approved facsimiles, depict not only air routes, but also spell out the lowest safe flight level or altitude above mean sea level.

The most modern of MAC's airlift fleet flies within the jet route system, (18,000 MSL through FL 450) well above most of the world's terrain. But some of the older MAC birds, recips, helicopters, and, occasionally, jets, fly within the low altitude structure (1,200 AGL through 18,000 MSL). FAA controlled airways provide 1,000 feet obstruction clearance in nonmountainous areas and 2,000 feet in designated mountainous regions. Minimum altitudes for safe flight on these routes are indicated on charts as Minimum Enroute Altitude (MEA) and Minimum Obstruction Clearance Altitude (MOCA). It takes remarkably little effort to maintain proper terrain clearance on these routes, but there are precautions that must be taken. Before takeoff, pilots and navigators should review the route of flight to ensure the requested climb and cruise altitude is at or above MEA.

Once the runway is behind you and you've intercepted the airway, keep the course deviation indicator centered and cockpit navaids updated. A one dot deviation 60 miles from the VOR indicates five miles off course and two dots, ten miles. A full scale CDI deflection could be bad news if the route threads its way through mountains. For flights cleared off low altitude airways, Air Force pilots must fly at not less than 1,000 feet (2,000 over



Minimum sector altitudes



Minimum and emergency safe altitudes

mountainous areas) above the highest obstacle within a horizontal distance of 22 miles either side of track. Outside the CONUS and FAA controlled areas, consult FLIP Planning and ICAO flight planning documents for the region of intended flight, as airway boundaries and terrain clearance criteria may differ appreciably. MEA's in some foreign countries do not take into account navigational signal coverage and offer only minimum terrain clearance.

Jet Route System

The jet route system is a navigational structure extending from 18,000 feet through flight level 450. Although this system is well above most hazardous terrain, there are a few areas of the world where mountain ranges and peaks knife their way up to nearly 30,000 feet.

Other Tips

The aircraft commander is responsible for ensuring safe terrain and obstruction clearance from takeoff to touchdown. And he has plenty of help. Today's modern jet transports are powerful, reliable, and fly higher and faster than anyone dreamed of not many years ago. Sophisticated flight director systems, dopplers, inertial nav systems, and vertical flight instrumentation provide pilots with near instantaneous readouts of position and flight status. Air Traffic Control has steadily evolved into a highly automated system of radar control and sequencing. Radar vectors, transponder altitude interrogation and numeric readout, RNAV, and categories II and III all-weather ILS landing systems are just a few examples of the current state of the art that replaced much of the do-it-yourself flying of the past. Advances in aviation technology and automated control are doing so much for the crews that it is easy to slide into the habit of devoting too little attention to terrain or position. The by-products of technology and automation are designed to assist and guide the pilot in flight, but obstruction clearance is the sole responsibility of the pilot.

The flight planning phase of flight is the time and place to become familiar with every aspect of the intended route of flight. MEA's, minimum safe and sector altitudes, and the general layout of terrain and obstacles along the route should become as familiar as a social security number. So take a little extra time with your navigator and look over his Tactical Pilotage Chart (TPC; scale 1:500,000) for the route to be flown. Place particular emphasis on obstruction clearance during the departure and arrival phases of flight. If you don't have a navigator, stop by route briefing and pick up a TPC. They're free! By the way, just about all MAC route briefing offices maintain a worldwide library of TPC's, Operational Navigational Charts (ONC's; 1:1,000,000), and Jet Navigational Charts (JNC's; 1:2,000,000), available for the asking.

A pilot can make mistakes when operating an aircraft and sometimes get by with a scare, embarrassment, verbal admonishment, or a lesson learned. But major errors concerning aircraft location in relation to obstructions seldom allow a second chance, an opportunity to freeze the "box," or Monday morning quarterbacking.

A tired crew, forgotten procedures, a dark sky — key elements in...

The crew landed late in the afternoon after a long day—mid-morning wake-up at home, mid-afternoon takeoff, and an augmented crew duty day of 23 hours, including two enroute stops. The aircraft commander had been granted 24 hours crew rest. He hoped to use this time to rest the crew and still have time to see the city.

It took some time to get the bags loaded, but as the bus finally got underway and began weaving in and out of traffic, the crew came to life. The men displayed the excitement of tourists as the city passed by outside. One camera buff was shouting over the grind of the bus as his camera clicked away at centuries old ruins.

None of the airmen thought much about the noisy location of the hotel as they checked into their quarters; but they did not look forward to spending the night in non air-conditioned rooms. One thought permeated all others, however — get out and see the city, take some pictures, have some fun.

A plan was made — into the shower and out on the town. The revived crew was on the street in record time. They visited the local festival, aware that they could see the rest of the city the next day. Hunger had set in by the end of the festival presentation. So they found a restaurant.

"Let's do it right; I'll buy some wine." The AC's generosity sparked the others to buy a second bottle. In a couple of hours, the crew emerged from the restaurant with their spirits high and their stomachs filled.

They enjoyed the local scenery and hospitality for a few hours, and returned to the hotel. The clock in the lobby was striking the hour of midnight as the weary men climbed into their beds. It had been a full day, more than 32 hours since most of them had slipped out of their stateside beds.

Most of the crew arose the next morning, somewhat refreshed, to continue with their crew rest plan — breakfast, a tour of the city, and back to the bunks for a few minutes rest before alert time. So, off they went. They were weary as they finally dropped onto their beds again, not long before alert time.

The alert came in mid-afternoon. Their exciting visit had ended. Most of them were still tired; and another long day with an en route stop lay ahead. They'd surely be exhausted by the time they touched down at home station.

The big jet roared up into the late evening sky. It had now been 52 hours since most of its crew had arisen at home station. Since then they had gotten no more than eight hours of bed rest and this was in their noisy, non air-conditioned hotel. Several of them were looking forward to the crew bunks in the aircraft.

The aircraft reached its assigned altitude and those crew members not required for cruise flight quickly found bunks on

which to lay their tired frames. The copilot was in the left seat, flying the aircraft. The third pilot would fly the final leg home.

The aircraft slipped quietly through the cold, thin air as night came. Below lay the snow-capped mountains, the islands, the lighted ships — a peaceful but false overture for what awaited the crew.

The moon dipped below the horizon, and with it the illumination which might have altered subsequent events. Descent and landing would be made in black but VFR conditions.

The fliers continued on toward their destination, their thoughts, perhaps, focused on events of the previous night and morning. Apparently there was less approach planning than usual. Descent clearance caught the crew somewhat by surprise. Some of the crew members were still asleep as center cleared the aircraft to FL 100. The power was eased back and down they went.

As the plane approached leveloff, the AC reported the altitude to center. Fatigue was beginning to show and he stumbled through the radio call, slurring some of his words. Suddenly, it dawned on him that the crew had forgotten the descent checklist.

The AC hinted for his copilot to call for the descent check. But the copilot was engrossed in flying a smooth descent and ignored the tacit gesture. The oversight went undetected by the rest of the crew. The navigator was busy with last minute entries in his log, and the engineer was occupied with his panel. As the aircraft commander keyed the interphone to initiate the checklist, center came on and cleared the aircraft direct to the final approach fix at FL 60, the transition level, and to contact approach control.

Distracted by center, the AC forgot about the checklist. And he also forgot to call transition level at FL 60. The aircraft drew closer to its final destination.

Because of multiple aircraft sorties in the destination area, the radio frequencies were nearly saturated. The pilots had difficulty contacting approach control. When they did get through, the controller confirmed the clearance to the initial approach fix and issued clearance to a lower altitude. But another aircraft cut out part of the transmission. "What was the altitude?" asked the copilot, "three thousand feet?" The crew was unsure, but finally agreed it sounded like, ". . . descent to three thousand feet." The aircraft commander read back "three thousand feet," expecting approach to correct any error. But the controller did not acknowledge, so the clearance stood, by default. The crew started on down, but failed to set the station altimeter setting. Shortly afterward, the controller cleared the bird for an ILS approach with GCA monitor. There was no mention of altitude, and the aircraft was handed off to the GCA unit for further control.

The aircraft checked in with GCA, reporting through 5,000 feet for 3,000 feet. But the radar unit was also saturated and the controller missed the part concerning altitude. Multiple recoveries were in progress at the field and GCA couldn't talk to the aircraft for a number of seconds. So the aircraft continued its descent toward 3,000 feet with its altimeter set at 29.92.

GCA finally called, ". . . this is GCA; what is your position?" But the crew was busy now and told the controller to stand by.

The navigator was probably the first to sense danger. As he searched his chart for obstacles in the area, he spotted a peak directly in the flight path, well above the aircraft's 3,000-foot altitude. He warned the pilots. The aircraft commander glanced out of the cockpit. They were in night, VFR conditions, so he told the navigator not to worry, since everything looked clear ahead.

Why had approach control descended the flight to 3,000 feet when the minimum sector altitude was 4,600 feet? Why had the aircraft been cleared below the ILS initial approach altitude of 4,000 feet? Actually, approach control had cleared it not to 3,000 feet, but to 5,000 feet. The crew had misunderstood the clearance and the pilot's readback to approach control had been cut out by other traffic. At 3,000 feet the aircraft was near tree top level, but no one realized it until too late.

The screech of tearing metal

resounded above the whine of the turbofans. The transport skimmed across the rocky plateau — tearing and ripping — and then, bouncing high into the air, rolled inverted, and crashed.

All but one of the crew were killed. All of the passengers aboard died. Few pieces in the resulting rubble were distinguishable as those of a former jet transport. It had been 58 hours since the crew had first gotten out of their beds to prepare for the mission.

* * *

In the aftermath of such tragedies, investigators search for causes, hoping to use them to prevent recurrence. The investigation turned up several cause factors in this accident, some of which intermingle.

Crew Rest

The aircraft commander had been granted 24 hours ground time at the last stop. But it was late afternoon when the aircraft landed and the crew members were not ready for bed. So they attended a festival and dined leisurely before retiring for the night. Then, after seven hours of bed rest in a noisy, hot hotel, they were up again in the morning with 13 hours left before takeoff — enough time to start wearing down again. During these 13 hours, the crew members got only a few minutes of rest. At takeoff, they had spent only eight of the last 56 hours in bed.

Fatigue

The crew showed definite signs of fatigue during the last segment of the mission. The surviving crew member acknowledged they were all tired at alert time, and an air traffic controller stated he sensed fatigue in the voice of the pilot during descent. Fatigue may have contributed to the lapses which ultimately caused the crash.

Discipline

Aircrew discipline almost certainly broke down at some point, leading to a situation from which the crew could not recover. From the position of various switches, investigators determined that some items had been omitted from the Before Starting Engines Checklist and the Descent Checklist.

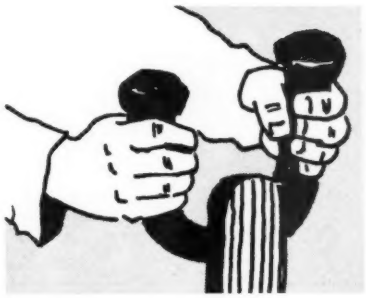
There were indications of other lapses: The copilot's altitude command marker had not been set for the expected approach altitude. If it had been, the crew might have thought to set the station altimeter. Had someone set in the station altimeter setting of 30.17, the aircraft might have been high enough to miss the hill, but no one did. Had the crew set the radar altimeter according to the checklist, they might have been conscious of the warning light as they passed through the preset altitude, but the radar altimeter was not set in the prescribed way. Had the navigator warned of the impending danger sooner, the pilot might not have descended too low, but the warning came too late. Had the pilot realized he could not see all terrain features in the darkness, he might have requested to stay at a higher altitude, but he felt he could see the obstacles. If the pilots and navigator had been aware of the minimum sector altitudes or the initial approach fix altitude, they might have recognized their error in descending to 3,000 feet; but again, they didn't. And finally, had the pilot immediately observed the navigator's warning of the danger and climbed, they might have missed the hill, but he didn't.

Lack of Awareness

One deficiency is immediately evident — a lack of awareness of the terrain elevation below the aircraft, a lack which in itself reflected a subtle disrespect for flight hazards. The pilot descended into the ground because he was unaware of the minimum altitude required for terrain clearance. It was his final error.

Techniques of flying to add a touch of class to your cockpit routine.

Technique Topics



Procedure — the act, method, or manner of proceeding in some process or course of action.

Technique — the method of procedure (with reference to practical or formal details) in rendering an artistic work or carrying out a scientific or mechanical operation.

(Webster's New World Dictionary)

While none of us is likely to argue with Webster, Air Force crew members are acutely aware that the line between "procedure" and "technique" in the cockpit is a much more definitive one than that drawn by lexicographers.

Procedures are usually established by directive, while each crew member may employ his own technique in following prescribed procedure — as long as there is no conflict between the two.

MACR 55-1 and services 55-1 regulations establish a great many pilot procedures, such as requirements for briefing altitudes, headings, and the like. And the regulation gives impetus to the statement that one of the most important requirements is for the aircraft commander to keep the crew informed of his intentions during all phases of flight.

The following technique has proven effective for veteran MAC pilots for many years, adding emphasis to, and expanding on a procedure in MACR 55-1 and services 55-1 regulations. This technique is suggestive and in no way should be considered directive in nature.

* * *

Announcing your intentions to the crew while in flight may produce numerous benefits, not the least of which is crew coordination and a system of double-checking. Flying a machine at three-fourths the speed of sound means that a pilot's thoughts have to be well ahead of his machine or else the machine does the flying and the pilot does the following. This is particularly true in jet transports. If you announce each heading, altitude, and airspeed change before making it, the old machine will have difficulty getting ahead of you. And, your fellow crew members will automatically sound off if you happen to be wrong. If you keep all those headings and such locked inside of you in the air, no one will know just what you're planning to do.

You might want to try some of these little techniques next time you venture skyward:

★ Just prior to the takeoff roll, after all your checks are complete, announce the first heading, altitude, and climb airspeed you intend to capture.

★ Throughout the rest of the flight, state any new heading, altitude, or airspeed change just before you initiate it.

★ Once you and your machine are on final approach, cleared, and ready to land, make your final statement of intentions. At 1,000 feet above the DH and MDA, announce your intended minimum altitude and the initial missed approach heading and altitude. You can bet the crew will tell you if you're wrong.

These little crew coordination techniques will go a long way toward keeping you and your crew well ahead of the machine. What better flight insurance could you have?

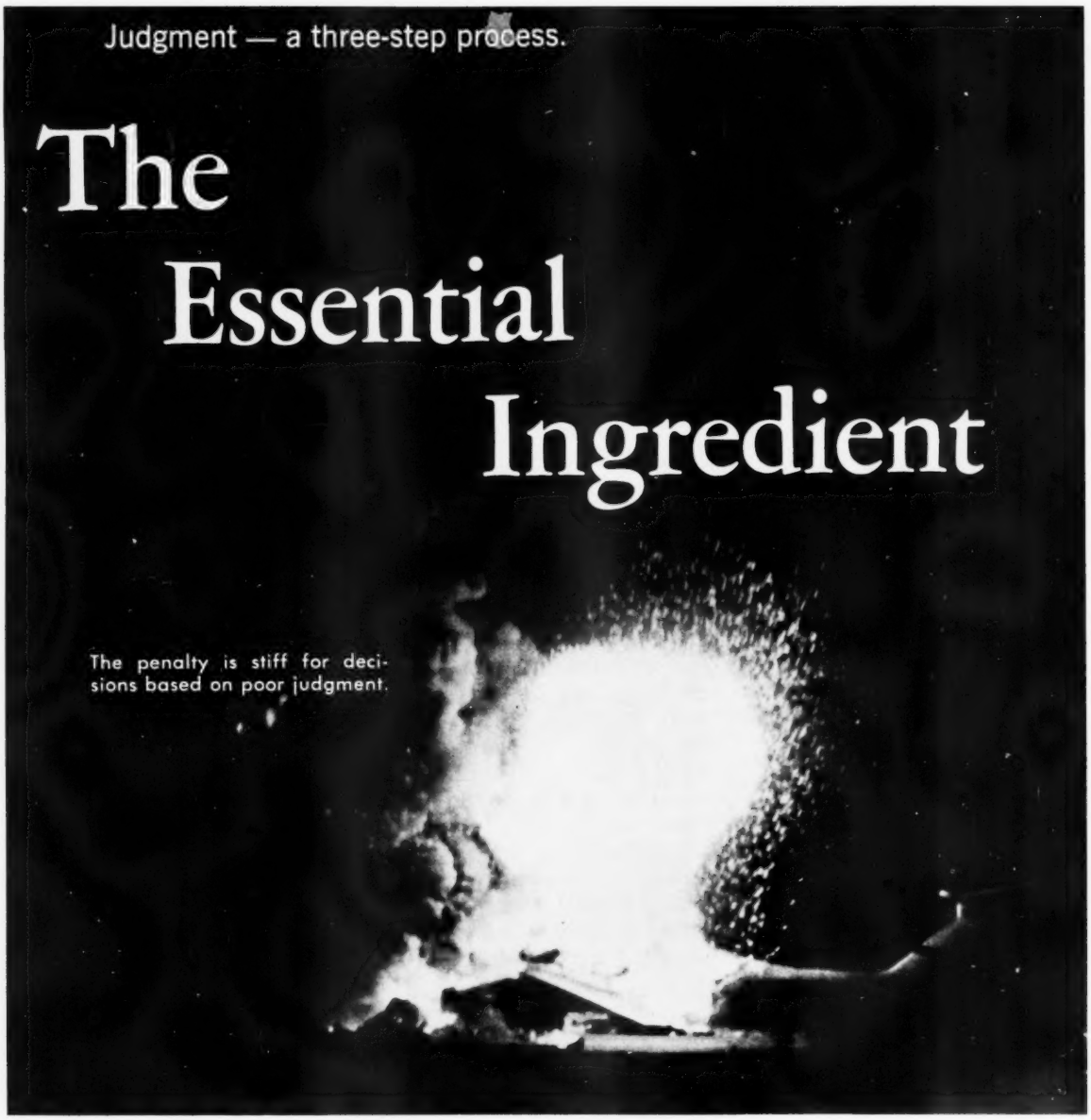
The extra seconds required to keep your crew informed may keep you from getting minutes, hours or even a lifetime behind your aircraft.

Pretty cheap insurance.

Editor's note. Like to share your pet technique with other MAC crew members? If so, just write it up and send it to: Technique Topics, THE MAC FLYER, MAC/IGYE/Stop 114, Scott AFB IL 62225.

Judgment — a three-step process.

The Essential Ingredient



The penalty is stiff for decisions based on poor judgment.

The essential ingredient of the good life is good judgment. Nobody's judgment is invariably good or correct, but some people seem to have a much higher batting average than others. Why?

Each of us makes countless judgments every day. Should we go to work or call in sick? Wear a class "A" uniform or something else? Have a kind word or snarl at the wife? Spank the kids or ignore them? Speed or obey the limit? Most of them are of little consequence by themselves, but often mean a great deal, collectively. Either way, they determine whether you prosper or fail, enjoy or suffer, live or die.

A judgment is a three-step process, regardless of who makes it or how well he does it. It begins by comparing the facts. Next, these facts are evaluated. Finally, a decision is made. Each step is critical. Let's look at them in detail.

Get the Facts

Many of us are immediately in trouble because we don't know a fact from an assumption, opinion, or untruth. And we get confused by shades of

Getting the facts

grey when we are looking only for black or white. Consider these, for example:

a. Winter weather is severe and cold.
b. A 60-degree bank pulls 2 Gs.
c. Ten hours a day is enough for any man to fly.
d. Lift is proportional to angle of attack.

Only "b" and "d" are facts; "a" is a fact only in certain areas of the world, and "c" must be classified as subjective opinion. A fact is verifiable and not subject to variance. It exists independent of people's opinions or interpretations.

Any judgment based on inaccurate or incomplete facts will most likely be a bad judgment.

Sometimes, emotion gets in the way of our fact gathering. For example, a pilot nearing the end of a long and extremely fatiguing flight is not likely to be a completely objective and impartial judge of ARTC competence when he receives a holding delay for no apparent reason. Irritated and frustrated, he will be inclined to view the "facts" through the tunnel vision of his emotions and make a bad judgment. It has happened many times. Later, after sleep has refreshed and restored his brain, the whole situation usually looks quite different.

The quantity of facts is important, too. Too many facts can confuse, while too few can lead to an erroneous conclusion. This principle is well known in our courtrooms where only the facts pertinent to the case being tried are allowed. Judges insist that opposing attorneys introduce all pertinent material, but uphold objections to any that is not. Thus, the eventual judicial decision or jury finding is uncolored by extraneous or irrelevant information.

Evaluate the Facts

Assuming that you have gathered a sufficient quantity of facts, the next step is to evaluate them. Here again, emotion is your worst enemy. Even if the facts are straight, strong emotions such as anger, hate, love, jealousy, pride, or loyalty can twist them out of shape. Prejudice, which means literally to "prejudge," is a constant hindrance since few of us, if any, are completely devoid of it. Prejudice is insidious. We see whatever we choose to see, hear what we choose to hear, define right and wrong by what we would like to be right and wrong.

It's not easy to concern yourself only with the facts and evaluate them coldly and objectively, but judgments arrived at by any other process tend to be less than perfect.

Consider the pilot who sees the approach lights dimly through the dense ground fog just as his huge aircraft arrives at the decision height for a precision approach. In a matter of split seconds, he must evaluate the facts — altitude, airspeed, fuel remaining, weather at alternate, priority of mission, crew fatigue and competence, length of runway, RCR, and so on — and make a decision: land or execute the missed approach.

Emotionally, he wants to land. His pride, for one thing, leads him to believe that he can make it. His fatigue and hunger drive him to get the aircraft on the ground as quickly as possible so he can relieve these unpleasant symptoms. His ego presses him toward impressing the copilot and the rest of the crew with his ability to perform brilliantly under adverse conditions. His respect for law and order, and his ingrained self-discipline tell him that a missed approach is the only legal course of action, but his experience tells him the law is "only a guide" and he is the only man on earth capable of making the correct decision on this particular problem at this particular time.

If he were able to stop this action in mid-flight and retire to a reclining position under a shady tree by a quiet brook, refreshed with sleep and a

Analyzing the problem

INGREDIENT — continued

fine meal, he would be much more able to review the facts and make a good judgment. But in aviation, decisions are normally made in milliseconds while traveling hundreds of miles per hour in an unnatural environment. The fact that so relatively few of them are bad is both a fine commentary on the human race and an accolade for airmen in particular.

Integrity, knowledge, and experience will tend to show up in a situation of this type. The decision eventually made will reflect not just the whim of the moment, but the total character of the man as developed during his entire lifetime. If he has never learned to think of others, his decision will not concern itself with the lives of his fellow crew members and the passengers in the cabin, or the people on the ground who might become victims of his crash. If he has made a career of short cuts and winking at the law, he will give short shrift to the directives covering the situation. If he cares little what others think of him, he will tend to react without regard to any adverse opinions which might accrue from his actions.

His knowledge of his aircraft, crew, meteorology, physics, and other aviation-oriented lore will determine how he interprets the facts involved. If this knowledge is skimpy or weak in spots, it will show up in any situation which allows room for error.

His experience is the sum total of everything he has retained from all learning situations. If he has had success by landing during marginal weather conditions in the past, he will tend to do so again. If he has used as his "models of excellence" other airmen who fly strictly by the rules, he will tend to execute the missed approach, other things being equal.

Make the Decision

The decision is the thing. It's possible to make a good decision using an emotional evaluation of incomplete facts, but the odds are heavily against it. Good or bad, whatever decision you make is often the one you're stuck with, especially at flight speeds. A third possibility, of course, is no decision — a wishy-washy lack of any type of action. This is probably the worst course of all. Do something! If it turns out you're wrong, perhaps time will allow you the luxury of determining your error and making a correct judgment which will save the day. But don't count on it. It's better to do it right the first time.

Making the decision

Correct decisions can be your strong suit, if you learn how to make them. No one is born knowing how to make decisions. It's a learned process. Here are a few hints on how to proceed:

a. Seek out people who seem to be successful and happy. Make them your "models of excellence" and try to find out how their judgment-making process differs from yours.

b. Read up on logic. Find out what a logical thought process is and how it differs from yours. Practice using pure logic in discussions with your family and friends.

c. Practice the art of discrimination, not against racial groups, but against illogic, superstition, half-truths, hearsay, prejudice, and opinion. Learn to pick out the facts and identify them quickly.

d. Learn to control your emotions. Recognize when you are in the grip of anger, hate, and other strong feelings. If you can, wait until you have returned to a more normal state of mind. If you can't, make allowances for your condition.

e. Learn from your mistakes and those of others. When your fellow airmen suffer an injury, get caught in a violation, or experience some other difficulty, examine the situation and ask yourself how it could have been avoided. Then put the principle learned into practice for yourself.

Remember this above all — a person who does not make good judgments will incur penalties. Not "may" but "will." No doubt about it. It's cause and effect. Light a match near an open gas tank and stand by for an explosion. The choice is yours.

A forgotten SID shatters the Aerial Ace's facade when standard vectors don't materialize.

C.R. TERROR

The Rotund One swung his bouncing anatomy around a corner of the operations building, barely missing a lieutenant colonel who for a split second mistook C. R. for a runaway truck.

"A thousand pardons, m'man," rasped the puffing C. R. His ebony cigarette holder swished perilously close to its owner's right eyeball en route to what C. R. considered a salute. "Is this where the Supervisor of Flying hangs out?"

"Quite all right, major," replied the colonel, too amazed at the package laden major's appearance to quarrel with the salute, "MAC operations is down the hall about two doors, on the right."

C.R. TERROR —continued

With cigarette in one hand, a number of wrapped boxes on a string tied to his other wrist, C. R. managed to push the door open. He scurried down the hall and in a few minutes was staring into the smiling face of a captain.

"Good morning, Major Terror," greeted the SOF, "your crew said they would wait for you in the snack bar. Your copilot and navigator completed the paperwork."

"Right on," grinned C. R., realizing that his own cleverness had once again relieved him of the cumbersome predeparture paperwork. "Then I guess it's time to blow this joint. Got a lot of goodies to take back."

"Well, Sir, but I have to brief

you on departure procedures. They've been . . ."

"Never mind all that." C. R. took pride in dispensing with unimportant details. "Been here before, know it by heart. See you next trip."

"But, Sir, SOF procedures require that I brief on departure, terrain, radio fre . . ."

"I know, I know. Just like old TCC, ACP, CP, and tweedle-dee-dee" rhymed the Wise One. "Old heads like me have seen all, heard all, and, in all modesty, we know all about this air patch."

"Sir . . ."

But it was no use. C. R. had noticed the SOF's courtesy and recognized it for what it was — an opening to expound on his great store of knowledge and experience.

"You're not talking to one of those 1,500 hour youngsters they call aircraft commanders nowadays. There may be pilots who need nursemaids, but you are definitely not looking at one of them now, m'boy. Next thing I know, you'll be out on the flight line bugging me 'til I'm off the ground."

"Sir, Exeter Two Depar . . ."

But even the SOF's machine-gun-like delivery failed.

"Never mind the departure," the Glib One interrupted. "We'll get radar vectors to on-course. Hee, hee. Can't get better than that."

With that, the burdened figure and its packages bounded out the door toward the snack bar.

"Hi, boss. Where in the world did you spend the night?" called Long Suffering Sam from a corner table, winking slyly at Blinky, Sgts Max Torque, and Ty Downs. "You look a little like you've been out on maneuvers."

"Never mind, you guys. We're behind schedule. That desk-bound S-O-F in there held me up too long. Let's light the burners on that four-stage rocket out there and get back to the U.S.A."

"Gee, I didn't think we were behind the schedule," replied Blinky, taken back by his boss' progress report.

"Not **the** schedule," explained C. R., "my schedule. I've got plans for tonight — the likes of which you're too young to appreciate."

The crew scrambled out of the snack bar with coffee cups in hand, and in a few minutes were in their aircraft and ready to taxi.

"Standby to cast off," shouted the anxious AC over interphone, shoving the throttles forward. The big bird just hunkered in place, but C. R. kept shoving.

"I think the brakes are still set, sir," reminded Sam, timidly.

"Harrumph, power looks okay, I guess," C. R. announced. The aircraft jerked forward as he released the brake.

"MAC 38099, hold your position!" It was tower calling. "SOF reports something hanging from under your left wing. He suggests you check it out."

The plane rocked as C. R. applied the brakes in an all but gentle fashion.

"I don't see nothing," he snapped, stretching his neck toward the left wing. "Don't know

why that refugee from a command post keeps holding up progress. Sgt Torque, seeing as how we've got a bunch of old women running things down there, better take a look or they'll never let us out of here."

An access door was hanging down loosely but was back in place within moments. The engineer made his way back up to the cockpit.

"Sir, it was an access door," explained Sgt Torque. "I shut it, but three of the four fasteners are worn and I doubt that it'll stay shut. Maybe we ought to go back and get it fixed."

"What? Can't be as bad as that. Why we used to fix such things with bailing wire. Just write it up at home station along with the rest of the stuff we've been saving. Let's go fly."

As the big jet turned onto the runway, its commander was discussing his theory of "Feminine Resistance to the Male Chauvinist Approach to Sex," when a call from Departure Control interrupted.

"Wha-d'ya mean Exeter Two Departure," moaned C. R. at the unexpected change in climb-out instructions. "We asked for a radar departure."

"Roger," the voice from Approach Control acknowledged, "but we're having trouble with our radar and expect it to be off for half an hour."

"Er, guess it's okay, then," the charitable aeronaut replied, forgivingly. "Understand, cleared Exeter Two Departure."

"Sir, we don't seem to have an Exeter Two Departure," Sam announced. "Didn't you pick them up from the SOF? He mentioned something about new ones."

"Don't need them," bluffed the unflappable Master. "Flown this Exeter Departure dozens of times. Er, climb three-six-zero, ah, to intercept the Huntingdon three-five, er, two nine degree radial at eight thousand or above. Right turn to cross, ah, Bed —, er, Huntingdon at ten thousand feet. Now, that's simple enough even for inexperienced copilots like you."

Sam decided to keep quiet since his boss obviously had forgotten more about the local procedures than most pilots ever learned.

C. R. pointed the big bird northward and it whined smoothly through broken cloud layers. As the craft approached the 290 degree radial, C. R. fingered the autopilot and turned smoothly to intercept, smiling approvingly at his own aeronautical adroitness.

"Sam, old chum, that's the way you'll be doing it in five thousand hours or so; why, just watch how I hand fly this bug sucker to a perfect level off." The Avoirdupois One grinned. He adjusted his seat forward and disengaged the autopilot.

"Yikes, what's going on," shouted C. R. as sudden turbulence rolled the transport. He struggled frantically with the controls as the big bird rolled left 60 degrees, flipped violently, and plunged earthward.

"Loadmaster! Engineer! Wha—Navigator, ahhh! Get on the controls, Sam. Mayday! Mayday! Man the lifeboats . . . rafts. Call for help."

C. R. strained at the yoke and finally remembered to retard the throttles. His eyes bulged under the G-forces as the plane began to respond slowly, finally leveling at 5,000 feet.

"Worst clear air turbulence I ever saw. Got to know how to handle it," croaked the Master Manipulator, throwing a sickly smile to his zombie-like copilot.

"Sir," gulped Sam weakly, "I don't think that was exactly clear air turbulence, unless you call vortex turbulence from a 747 clear air. You can still see him through the break in the cloud layer there."

"What's he doing at our altitude! These overpaid civilians are a hazard to man and beast," C. R. huffed, trying hard to regain his composure.

"MAC, request your altitude and position. Confirm you're on Exeter Two Departure," came an excited voice from Departure Control.

"You bet we were," shouted C. R., indignantly. "We were on the Huntingdon 290 degree radial at ten thousand until some knucklehead in a 747 got off his altitude and nearly knocked us out of the sky. We're climbing out of five thousand again for ten."

There was a short silence.

"MAC 38099, your altitude

C.R. TERROR —continued

should be four thousand until intercepting the three-one-zero degree radial. Our radar just came back on and you appear to be on the wrong departure. We suspect you didn't get the latest departure change. Stand by for radar vectors. Maintain present heading and altitude."

"How do they expect anybody to keep up with departures if they don't tell us," C. R. rasped. "Never saw such a thing in my life."

Sgt Torque, who had stopped smoking years ago, asked if anyone had a cigarette.

* * *

"Yes, except for my skill, we would've been in lots of hurt," recalled C. R. as the crew strode into the Command Post, "but, come to think of it, I've handled situations like that before, but it takes a real pro."

"Boy, you sure handled that one," admitted Blinky, almost recovered after the ten-hour flight home, "but you've got another situation coming up. Look who's waiting at the Command Post."

"Major Terror, I'd like a word with you," a tall colonel said sternly, drawing the Mighty One aside.

No doubt he's heard how I saved plane and crew, thought C. R. modestly. "Of course, sir. But I can't really take all the credit. You see, I have a good crew that . . ."

"If you don't mind, Major," barked the colonel, "I would like to know just why you think you should get any credit for disregarding a clearance and nearly colliding with an aircraft which just happened to have members of Congress among its 200 passengers."

"Congress? Ah, sir, well, it wasn't exactly my . . . well, you see this SOF out there . . . and, well, the radar was off and . . ." C. R.'s smile vanished.

"You realize, of course," the Wing Commander continued, "that you were charged with a violation and that you're grounded pending further investigation."

The Portly One sighed, shifting his weight from one foot to the other like a guilty schoolboy as the colonel stared at him in fuming silence.

"Anything else, er, I mean, is that all, sir. I have an appointment with this . . ."

"Yes, Major Terror, there is something else," roared the Colonel, "there is a good possibility that you'll have to pay to repair a European automobile that just happened to have a part off MAC 38099 smash through its windshield."

With that, the commander wheeled around and disappeared through the door, leaving C. R.'s open mouth resting on his chest.

"Sorry, boss," said Blinky, sympathetically, "but that's the way it goes, I guess."

"Nevertheless, Blinky," offered the Rotund One, struggling for optimism, "some good comes from everything and even now I can detect a silver lining."

"How's that, sir?" asked Blinky, incredulously.

"Well, since I'm going to be grounded for a while — only temporarily, understand, until I'm completely exonnerated — these junior birdmen around here will get my share of the flying and, thereby, gain invaluable experience," C. R. replied with a sly grin.

Blinky, unaccustomed to noble gestures from his aircraft commander, could hardly believe what he heard.

"Chief," he declared, swelling with rare admiration for his boss, "you never cease to amaze me. But what will you do in the meantime, work in scheduling?"

"Actually," winked the Unflappable One, "it seems as good a time as any to take a few days off for a well earned rest. It just so happens that I have this, ahem, friend, who starts vacation next week. Ah, even now, I can hear Waikiki calling."

QS QUICK STOPPERS

Rushed Preflight

As the loadmaster checked his airdrop equipment, the aircraft taxied out for takeoff. While he rewound the static line retriever cable, the swedge ball on the end of the cable snagged the floor momentarily, then swung across the cabin and hit an ACM in the mouth, breaking a tooth.

Maintenance problems had delayed preflight inspections and the aircraft commander, wanting to minimize the delay, directed the crew to expedite the preflight inspections. And that's exactly what the loadmaster was doing. The aircraft commander rushed his loadmaster by taxiing before all inspections were complete.

Fuel Shortage

Ground control cleared the twin-engine, civilian aircraft to runway 22R and tower cleared it for takeoff. The controller observed the aircraft pass the departure end of the runway at an estimated altitude of 300 feet, start a left turn, and descend into the water. Witnesses reported that there was no sound from either engine during the descent, which was described as flat

in attitude and with a high sink rate.

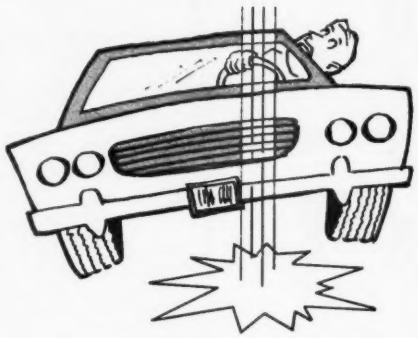
Investigators found the fuel selector valves positioned to left and right auxiliary tanks. The company operating the aircraft reported only "slosh" fuel was carried in these tanks, and that only the main and outboard tanks had been serviced prior to the flight.

— FLIGHT SAFETY FACTS

Qs —continued

Prodigal Panel

As the flaps and leading edge slats on the C-5 retracted following takeoff, a pylon panel tore loose from number four engine. The two-pound, 18 by 24-inch object slammed onto the expressway below. A passing motorist, just missed by the missile, stopped and removed the panel from the lane of traffic. He tossed



the piece of multi-million dollar airplane to the side of the road.

Maintenance men and aircrews can help prevent such incidents by closer checks of screws and dzus fasteners. Remember, each time a piece of an expensive aircraft plunges to earth, the taxpayer below is the one who may suffer.

Pedal Problems

While taxiing out to the takeoff pad, the student pilot noticed that it took excessive right pedal to turn his HH-53. The instructor took control of the aircraft, checked the pedal travel, and decided there was no problem. He made a normal takeoff and climbout, and flew to a nearby gunnery range. The student began a normal approach to a helicopter landing pad. When the helicopter was approximately 350 feet above the pad, the student reported that he was applying full right pedal in order to keep the helicopter straight. The instructor took control and initiated a go-around. At 800 feet he checked the flight controls but could find nothing wrong with the bird and decided to make a second approach to the pad.

As the IP began the approach, he found that full right pedal was required as torque was reduced to 27-30 percent. When torque was reduced further, the helicopter yawed to the left. The only way he could correct the yaw was to increase torque above 30 percent. The instructor abandoned this approach and climbed 2,000 feet above the ground. After reviewing Dash One procedures and conferring with the Command Post by radio, the instructor decided to return to home base and initiate a running landing.

Maintaining no less than 25 percent torque, he made the running landing and experienced no further problems. The instructor pilot stated later that he had not turned off the Automatic Flight Control System (AFCS) because he felt doing so might have compounded the problem.

An investigation revealed that during a tail rotor pitch link change the previous night, all four pitch links had been misrigged. Investigators recommended altering procedures to require an operational check when this type of flight control maintenance, not requiring an FCF, is performed.

Airborne Lumber Jack

The T-29 pilot radioed base Metro and received the following landing forecast: ". . . partial obscuration, 3,000 feet scattered, visibility three miles in thunderstorms and haze."

The weather report didn't indicate exactly where the cells were located, but on the PAR downwind leg, approach control vectored the aircraft around areas of heavy precipitation. Thirteen miles north of the base, the bird was handed over to GCA final. The crew had just completed the Before Landing Checklist when the controller advised that he was painting an area of precipitation from seven to four miles on final, but that final approach appeared to be clear from the four-mile point to the runway. The plane passed the seven-mile point and the rain and turbulence increased in intensity. At five miles, the pilot was having an extremely difficult time controlling the aircraft, but elected to continue the approach rather than execute a go-around.

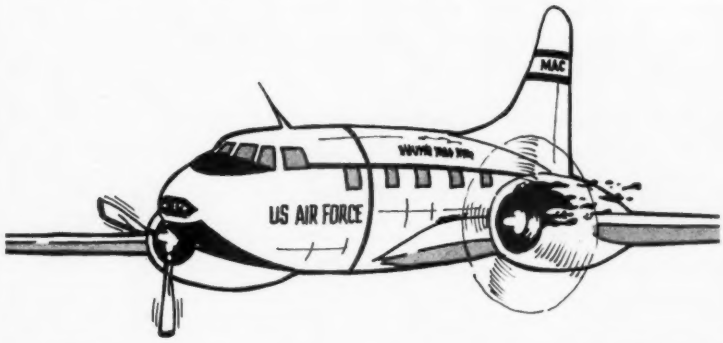
Suddenly a severe downdraft caught the aircraft and increased the rate of descent from the normal 500 to 700 feet per minute to 4,000 feet per minute. To slow the descent, the pilot applied power, but he was too late. The aircraft entered a stall or a near stall condition and clipped the tops of trees about four and one-half miles from the runway, denting the leading edge of the wing and bending the left main gear door.

Aircraft control was regained at tree contact, and the aircraft climbed back to glide path with dents in one wing and a gear door. The approach was continued and the plane landed without further incident.

Flying through the thunderstorm nearly ruined this crew's day. Don't let the same thing happen to you. Know exactly where the thunderstorms are located before you decide which way you're going.

Engine Shutdown, Engine Failure

The instructor pilot, demonstrating the autofeather system on a T-29 at altitude, shut down number two engine when, suddenly, number one began backfiring.



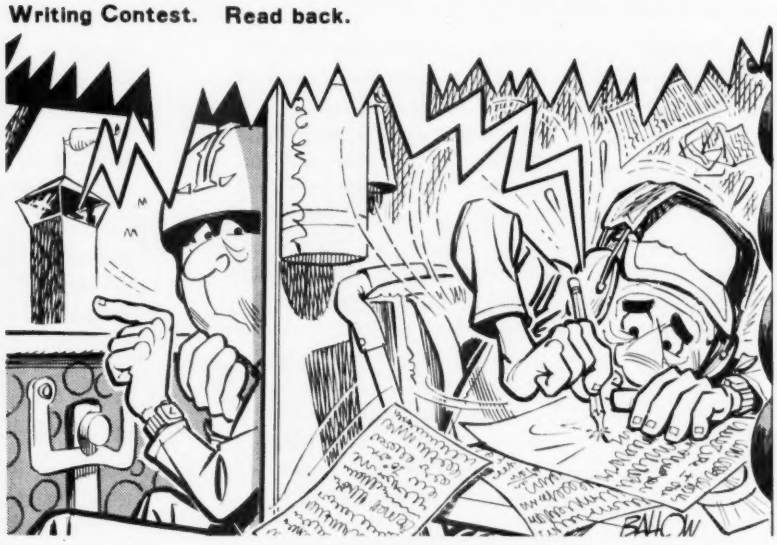
As number two was quickly restarted and power reduced on the backfiring engine, the crew saw oil streaming over the number one engine cowling. The propeller was feathered and the pilot made an uneventful single-engine landing at a nearby base.

Post-flight inspection of the engine revealed that during a recent engine change the safety wire had been left off a cylinder rocker pin nut. The nut backed off in flight, allowing the rocker pin to drop out, causing valve failure.

This incident explains the reasons for maintaining comfortable minimum altitudes for FCF and practice shutdowns, and demonstrates the importance of keeping the shutdown engine in a "restart" configuration during shutdown demonstrations. You could need it again in a hurry!

Maintenance personnel will be quick to detect another message — the importance of paying strict attention to tech order requirements while performing aircraft maintenance.

Ah, MAC 2134 -- Command Post wants to know if your crew members have completed their entries for the MAC Flying Safety Writing Contest. Read back.



LAST CALL

MAC Flying Safety Writing Contest

★ *You still have time.*

★ *Share your experience and knowledge.*

★ *Your message should concern some aspect of flight safety.*

★ *Suggested length 1,000 to 3,000 words. (About 6-14 typewritten pages, double spaced.)*

★ *All MAC personnel, including DAF civilians assigned to MAC, are eligible for awards.*

★ *Support personnel, particularly those in maintenance, are encouraged to submit articles.*

★ *Winning entries, with bylines, will be published in a future issue of The MAC Flyer.*

★ *You don't have to be a Hemingway or a Michener, so don't sweat the punctuation or grammar.*

★ *You guys are out where the action is, and your fellow aviators and support personnel need your story.*

★ *Contest closes 31 March 1974.*

★ *Turn on your mental boost pumps and pressure feed your safety pitch to:*

The MAC Flying Safety Writing Contest
MAC/IGYE
Scott AFB, IL 62225

after deadline . . .

SOF REPORTS -- In January we printed examples of Supervisors of Flying backing up MAC crews. Here are more cases in which the SOF prevented damage to aircraft and property and, in some instances, prevented injury.

* The SOF watched as the C-5 taxied out for takeoff with the ailerons inadvertently down-rigged rather than in the correct uprigged position. He relayed his observation to the crew through tower before takeoff.

* The SOF removed foreign objects -- a broken wooden pole and a large piece of solid ice -- from the taxi path of an aircraft, possibly preventing FOD.

* As a C-141 taxied out for takeoff, the SOF noticed the crew entrance door seal protruding. He radioed the pilot who stopped the aircraft and corrected the discrepancy, possibly preventing a pressurization leak and air abort.

* The SOF observed two chocks hanging from the right main gear strut on a departing aero-club aircraft. He advised the unsuspecting pilot of the possible danger. The pilot removed the chocks and then flew away minus the unintended speed brakes.

NEXT MONTH -- Feature articles next month include:

* Sixth Sense -- A look at a pilot's sixth sense. What is it? Why does it surface more frequently in helicopter pilots?

* Biorythms -- Does a person's life actually follow cycles of "ups" and "downs"? Read this interesting theory which may tell us when to be more cautious in our approach to safety.

* Arctic Rescue -- Some of the obstacles in arctic flying and how one crew overcame them during a harrowing rescue 600 miles north of the Arctic Circle.

* Thunderstorms -- A review of hazards approaching with the spring weather.

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